

## ICT6 : LaRC DAAC - SDPF Interface Confidence Test

### Background:

The Science Data Processing Facility at GSFC has the responsibilities for receiving the raw spacecraft telemetry data, performing the necessary level zero processing and transferring the L0 data products to the appropriate users for further processing. For the EOSDIS project, SDPF receives CERES L0 data and forwards both 24 hour products and quicklook products to the LaRC DAAC after completion of L0 processing. In addition, the SDPF also transfers TRMM Ephemeris (Predictive/Definitive Ephemeris) Data Products to the LaRC DAAC.

The communicating subsystems for data transfer between the SDPF and the LaRC DAAC are the Data Distribution Facility (DDF) Electronic Distribution System (EDS) and the Ingest Subsystem, respectively. With EBnet providing the communications path between them. The message flows supporting these product transfers are presented in Table ICT6-1. The Sensor Data Processing Facility (SDPF) Consumer Products and Interface Specification Document (510-203.102) provides detailed descriptions for each message type. Exhibit ICT6-1 presents the sequencing of these messages between the SDPF DDF EDS and the LaRC DAAC.

### Test Objectives:

- To verify that CERES Level 0 and Quick Look Data sets and ephemeris data (orbit and attitude data files) can be transferred from the SDPF to the LaRC DAAC.
- To verify proper implementation of interface error handling and exception processing.

Note: The SDPF control messages are handled by the Management Server Element (MSE) and the actual data files are handled through the File Server Element (FSE)

From	To	Data Flow	Communications Link
DDF MSE	LaRC DAAC	Authentication Request	EBnet
LaRC DAAC	DDF MSE	Authentication Response	EBnet
DDF MSE	LaRC DAAC	Data Availability Notice (DAN)	EBnet
LaRC DAAC	DDF MSE	Data Availability Acknowledgment (DAA)	EBnet
DDF FSE	LaRC DAAC	CERES L0 Data Files	EBnet
DDF FSE	LaRC DAAC	CERES Quick-look Data Files	EBnet
DDF FSE	LaRC DAAC	TRMM Ephemeris Data Files	EBnet
LaRC DAAC	DDF MSE	Data Delivery Notice (DDN)	EBnet
DDF MSE	LaRC DAAC	Data Delivery Acknowledgment (DDA)	EBnet

**Table ICT6-1 Message Flows**

### Requirements Verified:

TRMM1010\* TRMM1040 TRMM1050 TRMM1060 TRMM1070 TRMM1080  
TRMM1090\*\*TRMM1130 TRMM1180 TRMM1195 TRMM1200 TRMM1210  
TRMM1280 TRMM8100

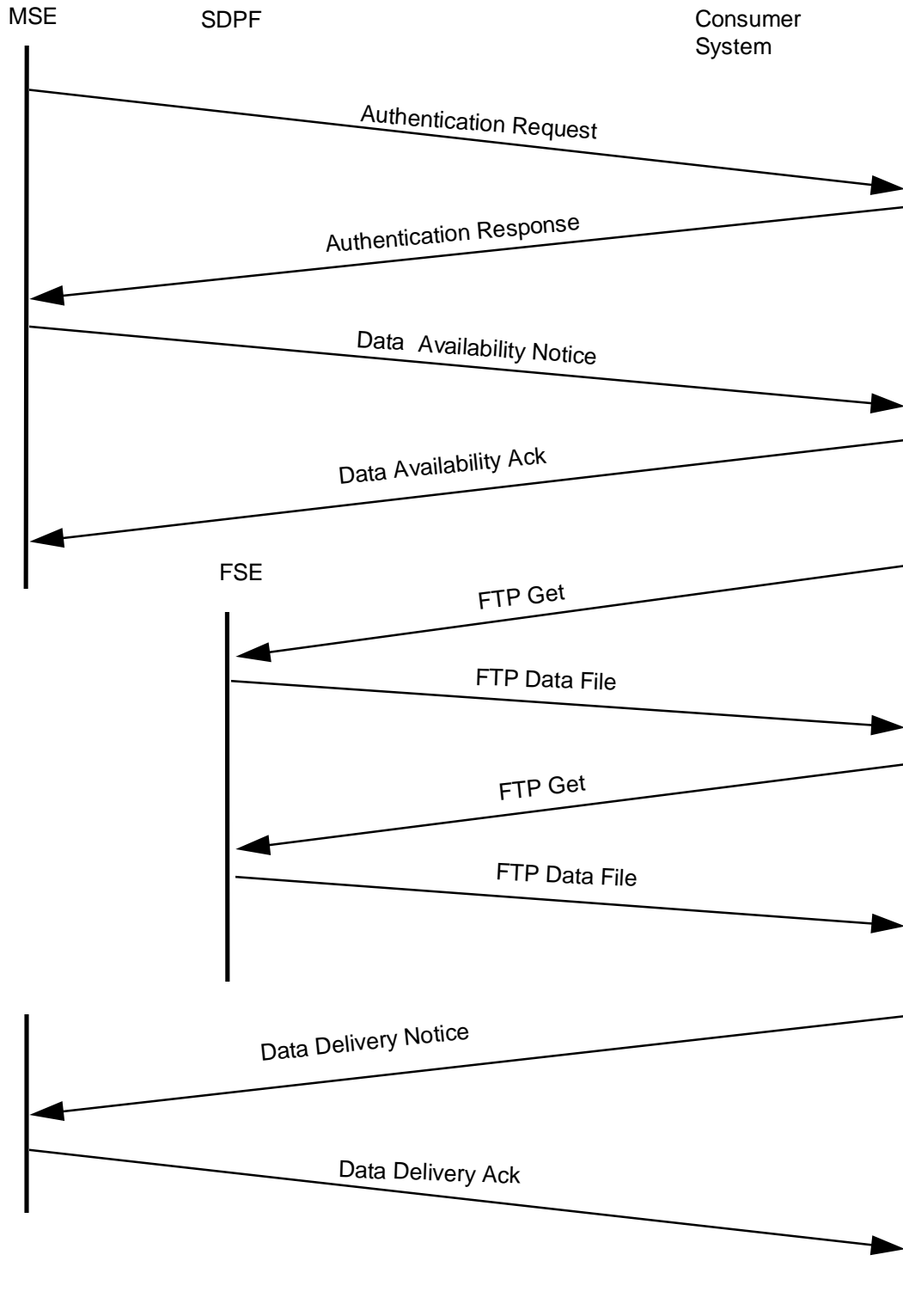
\*transfer only \*\* notification only

Test Configuration:

Hardware and software configurations at each ECS site are managed and tracked by the M&O organization at that site. The most current configuration status report will be obtained prior to the start of testing and be referenced in the test report. EXHIBIT ICT6-2 presents the current hardware configurations.

## **TBS**

### **EXHIBIT ICT6-2 SDPF - LaRC Configuration**



**Exhibit ICT6-1 SDPF to LaRC Message Flow**

## Participants and Support Requirements:

### Participants:

SDPF (DDF) Operations personnel

LaRC DAAC M&O personnel

I&T TC

### Communications:

Voice: SDPF - LaRC DAAC (Circuit **TBD**)

Data: SDPF connects to EBnet for transfer to LaRC DAAC

IP Addresses: **TBS**

### Equipment and Hardware:

Hardware:

Software:

Test Tools: **TBD** - Potentially DDF Simulator (DESIM) - Since the ability to produce errors has not been built into the DDF design, the need for DESIM maybe necessary in order to test the ability of the ECS to detect certain error conditions. Other error checking conditions can be performed through manipulation of LaRC DAAC acceptable parameters (which should be available as flat files or database tables).

### Test data:

Description/ Characteristics	Source	File/Script Name - Physical loc.
CERES L0 Product - Nominal Product - 24 hour day group (simulated)	CERES Instrument Team or SDPF	File/Script Name - <b>TBD</b> Physical Location - Data Files spread over 2 or more SDPF DDF File Servers (FSE)
CERES Quick-Look Product - Nominal Product - Data from one Spacecraft Contact Session (simulated)	CERES Instrument Team or SDPF	File/Script Name - <b>TBD</b> Physical Location - Data Files spread over 2 or more SDPF DDF File Servers (FSE)
Series of multiple CERES Products (L0 and Quick-Look) to be placed into the DDF distribution queue in quick succession ?????	CERES Instrument Team or SDPF	File/Script Name - <b>TBD</b> Physical Location - Data Files spread over 2 or more SDPF DDF File Servers (FSE)
Data/files with error conditions for ICT 6. 5 tests TBD		
TRMM Ephemeris Data - Prelaunch Ephemeris Data - Definitive Ephemeris Data - Predictive Ephemeris Data	FDF	File/Script Name - <b>TBD</b> Physical Location - Data Files spread over 2 or more SDPF DDF File Servers (FSE)

SDPF products consist of multiple Data files and their associated SFDU Headers. Reference the SDPF - Consumer Systems ICD for the detailed format descriptions of SDPF products.

## Test Case Descriptions:

### **V1-ICT-06-001      CERES L0 Product Transfers**

Test case description: CERES L0 Product Transfers

This testcase will verify the ability of the LaRC DAAC to receive CERES L0 Data Products from the SDPF. The test begins with the system operators verifying the operational readiness of their respective systems. The SDPF operator will then perform the necessary steps to make a CERES L0 Data Product enter the distribution queue. The automated data transfer will be monitored at both the SDPF and LaRC DAAC locations, to verify the proper sequencing of control messages and the transfer of the data product. Upon completion of the automated transfer, the LaRC DAAC L0 will store the data files and verify that the transfer is satisfactory.

#### Mapped Requirements:

TRMM1010#A	TRMM1040#A	TRMM1050#A	TRMM1060#A
TRMM1070#A	TRMM1080#A	TRMM1180#A	TRMM1280#A
TRMM8100#A			

#### Prerequisite conditions

#### Test inputs

CERES L0 Data product

#### Expected test results

Transfer of DAN, DAA, DDN, DDA, between SDPF and LaRC and transfer of CERES L0 Data Product to LaRC

#### Methods for analysis

Verify successful. transfer of DAN, DAA, DDN, DDA, between SDPF and LaRC and transfer of CERES L0 Data Product to LaRC

#### Assumptions and constraints

#### Test Procedures

Test Case ID	Step Type	Station	Operator action	Expected Result	Comments	Allocated Requirements
V1-ICT-06-001	1.001	SDPF	Verify SDPF is operational in appropriate Mode and Configuration - i.e. Capable of supporting Electronic Distribution	SDPF is operational and capable of supporting Electronic distribution.	If it is not in proper mode, the system shall be appropriately initialized.	
V1-ICT-06-001	1.002	LaRC DAAC	Verify LaRC DAAC is operational in a mode capable of supporting test.	LaRC DAAC is operational in a mode capable of supporting test.	If it is not in proper mode, the system shall be appropriately initialized.	
V1-ICT-06-001	1.003	SDPF and LaRC DAAC	Validate IP Address and Password information	Both systems should contain the valid information.		
V1-ICT-06-001	1.004	SDPF	Verify connection capabilities between DDF MSE and DAAC	Successful 'Ping' of other system	This is the interface for transfer of control messages	
V1-ICT-06-001	1.005	LaRC DAAC	Verify connection capabilities between DAAC and DDF FSE	Successful 'Ping' of other system	This is the interface for Product Transfer	
V1-ICT-06-001	1.006	SDPF	Verify contents of test data	The test data shall be CERES L0 data and is in the format as required by the test.	Generically, this step is to verify the data to be transmitted during the test execution is in fact "good".	TRMM10 40#A
V1-ICT-06-001	2.001	SDPF	Initiate procedures for the automated transfer of CERES L0 Data Product.	The SDPF will transmit the 'Authentication Request' to the LaRC DAAC.		
V1-ICT-06-001	2.002	LaRC DAAC	Verify receipt and validation of 'Authentication Request', verify 'Authentication Response' is sent to SDPF.	LaRC DAAC shall accept and validate the 'Authentication Request' and respond with a valid 'Authentication Response'		
V1-ICT-06-001	2.003	SDPF	Verify receipt and validation of 'Authentication Response' and issue of a DAN	The Network connection between the SDPF and LaRC DAAC shall be successfully opened and a DAN is issued by SDPF		
V1-ICT-06-001	2.004	LaRC DAAC	Verify successful receipt and validation of the DAN.	A message or log file should indicate the successful receipt and validation of the DAN. The data files shall be placed in the Ingest queue and a Short DAA shall be transferred to the SDPF.		
V1-ICT-06-001	2.005	SDPF	Verify DAN is transferred to the LaRC DAAC.	A message or log file should indicate transfer of the DAN.		TRMM10 50#A
V1-ICT-06-001	2.006	LaRC DAAC	Verify successful receipt and validation of the DAN.	A message or log file should indicate the successful receipt and validation of the DAN. Short DAA shall be transferred to the SDPF.		

Test Case ID	Step Type	Station	Operator action	Expected Result	Comments	Allocated Requirements
V1-ICT-06-001	2.007	SDPF	Verify the successful receipt of the DAA.	A message or log file should indicate successful receipt of the DAA		
V1-ICT-06-001	2.008	LaRC DAAC	Establish FTP connection with SDPF and issue a "GET" command.	Establish FTP link with SDPF and Reception of Data	The files shall be individually FTP'd from the DDF FSE via FTP GET command..	TRMM10 60#A
V1-ICT-06-001	2.009	LaRC DAAC	Exit FTP connection	Terminate FTP link with SDPF		
V1-ICT-06-001	2.010	LaRC DAAC	Verify that the appropriate files (as indicated in DAN) containing CERES L0 Data are ingested into the ECS and that they are valid.	Upon successful ingest, the data files shall be stored. and are valid		TRMM10 10#A, TRMM10 70#A, TRMM10 80#A TRMM11 80#A TRMM12 80#A TRMM81 00#A
V1-ICT-06-001	2.011	LaRC DAAC	Verify that a DDN is sent to the SDPF indicating the successful status of the data transfer.	A message or log file should indicate transfer of the DDN.		
V1-ICT-06-001	2.012	SDPF	Verify the successful receipt of the DDN and the transfer of the DDA to the LaRC DAAC.	A message or log file should indicate successful receipt of the DDN and transfer of the DDA		
V1-ICT-06-001	2.013	LaRC DAAC	Verify the successful receipt of the DDA.	A message or log file should indicate successful receipt of the DDA.	This step completes the transfer of the CERES L0 Product.	TRMM10 10#A
V1-ICT-06-001	2.014	Both	Verify the connection between the two systems has been terminated.	No connection should exist following the end of the exchange messages.		
V1-ICT-06-001	2.015	LaRC DAAC	Query the DAACs archive to verify the storage of the data product and it's associated metadata.	Both the metadata and product should be stored in its appropriate locations.		

## V1-ICT-06-002 CERES Quick-look Product Transfers

Test case description: CERES Quick-look Product Transfers

This testcase will verify the ability of the LaRC DAAC to receive CERES L0 Quicklook Data Products from the SDPF. The test begins with the system operators verifying the operational readiness of their respective systems. The SDPF operator will then perform the necessary steps to make a CERES L0 Quicklook Data Product enter the distribution queue. The automated data transfer will be monitored at both the SDPF and LaRC

DAAC locations, to verify the proper sequencing of control messages and the transfer of the data product. Upon completion of the automated transfer, the LaRC DAAC will store the data files and verify that the transfer is satisfactory.

Mapped Requirements:

TRMM1010#A	TRMM1040#A	TRMM1050#A	TRMM1060#A
TRMM1070#A	TRMM1080#A	TRMM1130#A	TRMM1180#A
TRMM1280#A	TRMM8100#A		

Prerequisite conditions

Test inputs

CERES Quick-look Data product

Expected test results

Transfer of DAN, DAA, DDN, DDA, between SDPF and LaRC and transfer of CERES Quick look Data Product to LaRC

Methods for analysis

Verify successful. transfer of DAN, DAA, DDN, DDA, between SDPF and LaRC and transfer of CERES Quick-look Data Product to LaRC

Assumptions and constraints

Test Case ID	Step Type	Station	Operator action	Expected Result	Comments	Allocated Requirements
V1-ICT-06-002	1.001	SDPF	Verify SDPF is operational in appropriate Mode and Configuration - i.e. Capable of supporting Electronic Distribution	SDPF is operational and capable of supporting Electronic distribution.	If it is not in proper mode, the system shall be appropriately initialized.	
V1-ICT-06-002	1.002	LaRC DAAC	Verify LaRC DAAC is operational in a mode capable of supporting test.	LaRC DAAC is operational in a mode capable of supporting test.	If it is not in proper mode, the system shall be appropriately initialized.	
V1-ICT-06-002	1.003	SDPF and LaRC DAAC	Validate IP Address and Password information	Both systems should contain the valid information.		

Test Case ID	Step Type	Station	Operator action	Expected Result	Comments	Allocated Requirements
V1-ICT-06-002	1.004	SDPF	Verify connection capabilities between DDF MSE and DAAC	Successful 'Ping' of other system	This is the interface for transfer of control messages	
V1-ICT-06-002	1.005	LaRC DAAC	Verify connection capabilities between DAAC and DDF FSE	Successful 'Ping' of other system	This is the interface for Product Transfer	
V1-ICT-06-002	1.006	SDPF	Verify contents of test data	The test data shall be CERES Quick-look data and is in the format as required by the test.	Generically, this step is to verify the data to be transmitted during the test execution is in fact "good".	TRMM10 40#A
V1-ICT-06-002	2.001	SDPF	Initiate procedures for the automated transfer of CERES Quick-look Data Product.	The SDPF will transmit the 'Authentication Request' to the LaRC DAAC.		
V1-ICT-06-002	2.002	LaRC DAAC	Verify receipt and validation of 'Authentication Request', verify 'Authentication Response' is sent to SDPF.	LaRC DAAC shall accept and validate the 'Authentication Request' and respond with a valid 'Authentication Response'		
V1-ICT-06-002	2.003	SDPF	Verify receipt and validation of 'Authentication Response' and issue of a DAN	The Network connection between the SDPF and LaRC DAAC shall be successfully opened. and a DAN is issued by SDPF		
V1-ICT-06-002	2.004	LaRC DAAC	Verify successful receipt and validation of the DAN.	A message or log file should indicate the successful receipt and validation of the DAN. The data files shall be placed in the Ingest queue and a Short DAA shall be transferred to the SDPF.		
V1-ICT-06-002	2.005	SDPF	Verify DAN is transferred to the LaRC DAAC.	A message or log file should indicate transfer of the DAN.		TRMM10 50#A
V1-ICT-06-002	2.006	LaRC DAAC	Verify successful receipt and validation of the DAN.	A message or log file should indicate the successful receipt and validation of the DAN. Short DAA shall be transferred to the SDPF.		
V1-ICT-06-002	2.007	SDPF	Verify the successful receipt of the DAA.	A message or log file should indicate successful receipt of the DAA		
V1-ICT-06-002	2.008	LaRC DAAC	Establish FTP connection with SDPF and issue a "GET" command.	Establish FTP link with SDPF and Reception of Data	The files shall be individually FTP'd from the DDF FSE via FTP GET command..	TRMM10 60#A
V1-ICT-06-002	2.009	LaRC DAAC	Exit FTP connection	Terminate FTP link with SDPF		
V1-ICT-06-002	2.010	LaRC DAAC	Verify that the appropriate files (as indicated in DAN) containing CERES Quick-look Data are ingested into the ECS and that they are	Upon successful ingest, the data files shall be stored and are valid		TRMM10 10#A, TRMM10 70#A, TRMM10

Test Case ID	Step Type	Station	Operator action	Expected Result	Comments	Allocated Requirements
			valid.			80#A TRMM11 80#A TRMM12 80#A TRMM81 00#A
V1-ICT-06-002	2.011	LaRC DAAC	Verify that a DDN is sent to the SDPF indicating the successful status of the data transfer.	A message or log file should indicate transfer of the DDN.		
V1-ICT-06-002	2.012	SDPF	Verify the successful receipt of the DDN and the transfer of the DDA to the LaRC DAAC.	A message or log file should indicate successful receipt of the DDN and transfer of the DDA		
V1-ICT-06-002	2.013	LaRC DAAC	Verify the successful receipt of the DDA.	A message or log file should indicate successful receipt of the DDA.	This step completes the transfer of the CERES Quick-look data Product.	TRMM10 10#A TRMM11 30#A
V1-ICT-06-002	2.014	Both	Verify the connection between the two systems has been terminated.	No connection should exist following the end of the exchange messages.		
V1-ICT-06-002	2.015	LaRC DAAC	Query the DAACs archive to verify the storage of the data product and it's associated metadata.	Both the metadata and product should be stored in its appropriate locations.		

## 6.2 TRMM Ephemeris Data Product Transfers

### Test case description:

This testcase will verify the ability of the LaRC DAAC to receive TRMM Ephemeris Data Products from the SDPF. The test begins with the system operators verifying the operational readiness of their respective systems. The SDPF operator will then perform the necessary steps to make a TRMM Ephemeris Data Product enter the distribution queue. The automated data transfer will be monitored at both the SDPF and LaRC DAAC locations to verify the proper sequencing of control messages and the transfer of the data product. Upon completion of the automated transfer, the LaRC DAAC will store the data files and verify that the transfer is satisfactory.

### Mapped Requirements

TRMM1195#A      TRMM1200#A      TRMM1205#A

### Prerequisite conditions

Test inputs

TRMM Ephemeris Data product

Expected test results

Transfer of DAN, DAA, DDN, DDA, between SDPF and LaRC and transfer of CERES Quick look Data Product to LaRC

Methods for analysis

Verify successful. transfer of DAN, DAA, DDN, DDA, between SDPF and LaRC and transfer of CERES Quick-look Data Product to LaRC

Assumptions and constraints

Test Case ID	Step Type	Station	Operator action	Expected Result	Comments	Allocated Requirements
V1-ICT-06-003	1.001	SDPF	Verify SDPF is operational in appropriate Mode and Configuration - i.e. Capable of supporting Electronic Distribution	SDPF is operational and capable of supporting Electronic distribution.	If it is not in proper mode, the system shall be appropriately initialized.	
V1-ICT-06-003	1.002	LaRC DAAC	Verify LaRC DAAC is operational in a mode capable of supporting test.	LaRC DAAC is operational in a mode capable of supporting test.	If it is not in proper mode, the system shall be appropriately initialized.	
V1-ICT-06-003	1.003	SDPF and LaRC DAAC	Validate IP Address and Password information	Both systems should contain the valid information.		
V1-ICT-06-003	1.004	SDPF	Verify connection capabilities between DDF MSE and DAAC	Successful 'Ping' of other system	This is the interface for transfer of control messages	
V1-ICT-06-003	1.005	LaRC DAAC	Verify connection capabilities between DAAC and DDF FSE	Successful 'Ping' of other system	This is the interface for Product Transfer	
V1-ICT-06-003	1.006	SDPF	Verify contents of test data	The test data shall be TRMM Ephemeris data and is in the format as required by the test.	Generically, this step is to verify the data to be transmitted during the test execution is in fact "good".	
V1-ICT-06-003	2.001	SDPF	Initiate procedures for the automated transfer of TRMM Ephemeris Data	The SDPF will transmit the 'Authentication Request' to the LaRC DAAC.		

Test Case ID	Step Type	Station	Operator action	Expected Result	Comments	Allocated Requirements
			Product.			
V1-ICT-06-003	2.002	LaRC DAAC	Verify receipt and validation of 'Authentication Request', verify 'Authentication Response' is sent to SDPF.	LaRC DAAC shall accept and validate the 'Authentication Request' and respond with a valid 'Authentication Response'		
V1-ICT-06-003	2.003	SDPF	Verify receipt and validation of 'Authentication Response' and issue of a DAN	The Network connection between the SDPF and LaRC DAAC shall be successfully opened and a DAN is issued by SDPF		TRMM1195#A
V1-ICT-06-003	2.004	LaRC DAAC	Verify successful receipt and validation of the DAN.	A message or log file should indicate the successful receipt and validation of the DAN. A Short DAA shall be transferred to the SDPF.		
V1-ICT-06-003	2.005	SDPF	Verify DAN is transferred to the LaRC DAAC.	A message or log file should indicate transfer of the DAN.		
V1-ICT-06-003	2.006	LaRC DAAC	Verify successful receipt and validation of the DAN.	A message or log file should indicate the successful receipt and validation of the DAN. Short DAA shall be transferred to the SDPF.		
V1-ICT-06-003	2.007	SDPF	Verify the successful receipt of the DAA.	A message or log file should indicate successful receipt of the DAA		
V1-ICT-06-003	2.008	LaRC DAAC	Establish FTP connection with SDPF and issue a "GET" command.	Establish FTP link with SDPF and Reception of Data	The files shall be individually FTP'd from the DDF FSE via FTP GET command..	
V1-ICT-06-003	2.009	LaRC DAAC	Exit FTP connection	Terminate FTP link with SDPF		
V1-ICT-06-003	2.010	LaRC DAAC	Verify that the appropriate files (as indicated in DAN) containing TRMM Ephemeris Data are ingested into the ECS and that they are valid.	Upon successful ingest, the data files shall be stored and are valid.		TRMM1200#A TRMM1210#A
V1-ICT-06-003	2.011	LaRC DAAC	Verify that a DDN is sent to the SDPF indicating the successful status of the data transfer.	A message or log file should indicate transfer of the DDN.		
V1-ICT-06-003	2.012	SDPF	Verify the successful receipt of the DDN and the transfer of the DDA to the LaRC DAAC.	A message or log file should indicate successful receipt of the DDN and transfer of the DDA		
V1-ICT-06-003	2.013	LaRC DAAC	Verify the successful receipt of the DDA.	A message or log file should indicate successful receipt of the DDA.	This step completes the transfer of the TRMM Ephemeris data Product.	
V1-ICT-06-003	2.014	Both	Verify the connection between the two systems has been terminated.	No connection should exist following the end of the exchange messages.		
V1-ICT-06-003	2.015	LaRC DAAC	Query the DAACs archive to verify the storage of the data	Both the metadata and product should be stored in its		

Test Case ID	Step Type	Station	Operator action	Expected Result	Comments	Allocated Requirements
			product and it's associated metadata.	appropriate locations.		

#### ICT6.4 Multiple CERES Product Transfers

Under Review

Not updated from 10/15 Version

SDPF will send multiple DANs (products of L0, Quicklook and TRMM Ancillary Data) in quick succession to the LaRC DAAC to initiate the transfer of the data products to the LaRC DAAC. The DAAC will verify that the products are placed in the ingest queue, and that any priorities for product type are properly assigned (a higher priority should be given to the Quicklook product due to the need of a quick distribution). SDPF (DDF) and the DAAC will monitor the transfer and verify successful completion. Upon completion of the automated transfer, the LaRC DAAC storage archive will be queried for the proper storage of the products and their associated metadata

Requirements Satisfied:

Derived

Test Procedures:

Test Set-up:

Step	Station	Action	Expected Results	Comments
1.	SDPF	Verify SDPF is operational in appropriate Mode and Configuration - i.e. Capable of supporting Electronic Distribution	If it is not in proper mode, the system shall be appropriately initialized.	Exact procedures are outside of scope of test, supporting personnel will be responsible for their execution.
2.	LaRC DAAC	Verify LaRC DAAC is operational in a mode capable of supporting test.	If it is not in proper mode, the system shall be appropriately initialized.	Exact procedures are outside of scope of test, supporting personnel will be responsible for their execution.
3.	SDPF and LaRC DAAC	Validate IP Address and Password information	Both systems should contain the valid information.	This step is needed to ensure flawless test execution.
4.	SDPF	Verify connection capabilities between DDF MSE and DAAC	Successful 'Ping' of other system	This is the interface for transfer of control messages
5.	LaRC DAAC	Verify connection capabilities between DAAC and DDF FSE	Successful 'Ping' of other system	This is the interface for Product Transfer

6.	SDPF	Verify contents of test data	The test data shall be of the appropriate Instrument, size and format as required by the test.	Generically, this step is to verify the data to be transmitted during the test execution is in fact “good”.
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**Test Execution:**

Step	Station	Action	Expected Results	Comments
1.	SDPF	Perform necessary pre-processing in order to initiate the automated transfer of the data products.	The SDPF will transmit the ‘Authentication Request’ to the LaRC DAAC.	SDPF Operational procedures will be followed. Note also that the ‘Authentication Request’ will only be sent once. This is due to the fact that the automated process first checks for a connection between the two systems, if one exists, there is no need to re-authorize.
2.	LaRC DAAC	Verify receipt and validation of ‘Authentication Request’, verify ‘Authentication Response’ is sent to SDPF.	LaRC DAAC shall accept and validate the ‘Authentication Request’ and respond with a valid ‘Authentication Response’	
3.	SDPF	Verify receipt and validation of ‘Authentication Response’	The Network connection between the SDPF and LaRC DAAC shall be successfully opened.	
4.	SDPF	Verify that the DANs are transferred to the LaRC DAAC.	A message or log file should indicate transfer of the DANs.	
5.	LaRC DAAC	Verify successful receipt and validation of the DANs.	A message or log file should indicate the successful receipt and validation of the DANs. The data files shall be placed in the Ingest queue, with priority, and a Short DAA shall be transferred to the SDPF for each DAN.	The datafiles from quicklook products should be placed in the ingest queue with a higher priority than the L0 or ancillary products.
6.	SDPF	Verify the successful receipt of the DAAs.	A message or log file should indicate successful receipt of the DAAs.	

7.	LaRC DAAC	Verify that the appropriate files (as indicated in DAN) are ingested into the ECS.	Upon successful ingest, the data files shall be placed in a transferred to a permanent archive and appropriate Metadata should be produced.	When the files reach the top of the ingest queue, they shall be individually FTP'd from the DDF FSE via FTP GET command.
8.	LaRC DAAC	Verify that a DDN is sent to the SDPF indicating the successful status of the data transfer for each of the DANs.	A message or log file should indicate transfer of the DDNs.	
9.	SDPF	Verify the successful receipt of the DDNs and the transfer of the DDAs to the LaRC DAAC.	A message or log file should indicate successful receipt of the DDNs and transfer of the DDAs.	
10.	LaRC DAAC	Verify the successful receipt of the DDA.	A message or log file should indicate successful receipt of the DDA.	This step completes the transfer of the SDPF Data Products.
11.	Both	Verify the connection between the two systems has been terminated.	No connection should exist following the end of the exchange messages.	The connection between systems shall remain open until the last of the DDAs are received.
12.	LaRC DAAC	Query the DAACs archive to verify the storage of the data products and their associated metadata.	Both the metadata and products should be stored in their appropriate locations.	

#### Test Termination:

Step	Station	Action	Expected Results	Comments
1.	SDPF	Return the SDPF DDF system to the state 'Operational Mode' it was in prior to the test.	.	Leave things as they were found
2.	LaRC DAAC	Return the LaRC DAAC to the state it was in prior to the test.		Leave things as they were found

## **ICT6.5 Error Handling**

### Description:

The purpose of this test is to ensure LaRC DAACs implementation of error handling during the automated data transfer process between the SDPF and LaRC DAAC. This testcase is broken into four sub-tests, each of which testing the LaRC DAACs error handling of a specific control message.

### Special Notes:

The SDPF maybe unable to support these testcases due the necessity of inducing error conditions. If this is the case, we will use DESIM to simulate the capabilities of the SDPF DDF EDS. (is DESIM not a part of SDPF?)

Errors can be induced either on the sending side - by manipulating messages before they are transmitted or on the receiving side - by manipulating the expected values which the control messages are to be validated against. The exact method for inducing error conditions need be resolved prior to test execution.

### **ICT6.5.1 Error Handling - Authentication Message**

#### Description:

This testcase is to ensure that the LaRC DAAC is capable of detecting error conditions in 'Authentication Requests' received from the SDPF and to verify that permission to connect is rejected upon detection of such errors. The 'Test Execution' procedures will be executed for each of the following invalid authentication requests from the SDPF:

Error-1	Invalid Message Type
Error-2	Invalid source system code
Error-3	Message length parameter does not match actual message length
Error-4	Invalid destination system code
Error-5	Invalid User ID
Error-6	Invalid Password

#### Requirements Satisfied:

TRMM1080

#### Test Procedures:

#### Test Set-up:

Step	Station	Action	Expected Results	Comments
1.	SDPF and LaRC DAAC	Determine the methods of inducing the necessary error conditions and generate any necessary data or database changes.	The necessary system/data modifications will be ready to support the error testing	This step should be executed well in advanced of anticipated text execution date.
2.	SDPF	Verify SDPF is operational with the appropriate Mode and Configuration - i.e. Capable of supporting Electronic Distribution	If it is not in proper mode, the system shall be appropriately initialized.	Exact procedures are outside of scope of test, supporting personnel will be responsible for their execution.
3.	LaRC DAAC	Verify LaRC DAAC is operational in a mode capable of supporting test.	If it is not in proper mode, the system shall be appropriately initialized.	Exact procedures are outside of scope of test, supporting personnel will be responsible for their execution.
4.	SDPF and LaRC DAAC	Validate IP Address and Password information	Both systems should contain the valid information.	This step is needed to ensure flawless test execution.
5.	SDPF	Verify connection capabilities between DDF MSE and DAAC	Successful 'Ping' of other system	This is the interface for transfer of control messages

6.	LaRC DAAC	Verify connection capabilities between DAAC and DDF FSE	Successful 'Ping' of other system	This is the interface for data transfer
7.	SDPF	Verify contents of test data	The test data shall be of the appropriate Instrument, size and format as required by the test.	Generically, this step is to verify the data to be transmitted during the test execution is in fact "good".

#### Test Execution:

Step	Station	Action	Expected Results	Comments
1.	SDPF	Perform necessary pre-processing in order to initiate the automated transfer of the data products.	The SDPF will transmit the 'Authentication Request' to the LaRC DAAC.	SDPF Operational procedures will be followed.
2.	LaRC DAAC	Verify receipt and validation of 'Authentication Request', verify 'Authentication Response' is sent to SDPF.	For Error-1 and Error-2 LaRC DAAC should break connection immediately. For Error-3 through Error-7 LaRC DAAC should send SDPF an 'Authentication Response' with disposition set to 'Reject' and immediately break the connection.	For Error-1 and Error-2 LaRC DAAC will be unable to either identify the type of message received or the source of the message, thus rendering itself unable to respond to the error.
3.	SDPF	For Error-3 through Error-7 verify receipt and logging of 'Authentication Response'.	The message should be received with the appropriate error indicated.	

#### Test Termination:

Step	Station	Action	Expected Results	Comments
1.	SDPF	Return the SDPF DDF system to the state 'Operational Mode' it was in prior to the test.	.	Leave things as they were found
2.	LaRC DAAC	Return the LaRC DAAC to the state it was in prior to the test.		Leave things as they were found

## **ICT6.5.2 Error Handling - Data Availability Notice**

### Description:

This testcase is to ensure that the LaRC DAAC is capable of discovering error conditions in 'Data Availability Notices' received from the SDPF and verify LaRC DAACs ability to respond with a Data Availability Acknowledgment with disposition set to 'Reject' and the

appropriate error indicated. Recall that there are two classes of DAN errors, the first indicating that an error was discovered in the DANs header and the second indicating errors in the individual file description PVL. This test will be executed for each of the following error conditions. Remember that the type of DAA is dependent on the type of error encountered; Case-1 errors will result in Short DAAs and Case-2 errors will result in Long DAAs.

Case-1          Short DAA reports

Error-1	Invalid DDF Control System ID
Error-2	Invalid DAN sequence number
Error-3	Invalid Project ID
Error-4	Invalid Mission ID
Error-5	Invalid DDF File System ID
Error-6	Invalid file count
Error-7	Invalid data service
Error-8	EDU label error
Error-9	DAN label error
Error-10	Invalid DAN length
Error-11	Invalid aggregate length
Error-12	Database failures
Error-13	Duplicate DAN sequence number

Case-2          Long DAA Reports

Error-14	Invalid Data Version
Error-11	Invalid data type
Error-16	Invalid distribution criteria
Error-12	Invalid descriptor
Error-13	Invalid directory
Error-19	Invalid time stamp format
Error-20	Invalid generation time format
Error-14	Invalid file size field
Error-15	Invalid short file ID
Error-16	Invalid time/data format
Error-24	Invalid FILE_ID
Error-25	Duplicate file group ID

Proper values for these parameters are specified in Tables 4-3 and 4-6 of the Sensor Data Processing Facility (SDPF) Consumer Products and Interface Specification Document (510-203.102);

Requirements Satisfied:

TRMM1080

Test Procedures:

Test Set-up:

Step	Station	Action	Expected Results	Comments
1.	SDPF and LaRC DAAC	Determine the methods of inducing the necessary error conditions and generate any necessary data or database changes.	The necessary system/data modifications will be ready to support the error testing	This step should be executed well in advanced of anticipated text execution date.
2.	SDPF	Verify SDPF is operational with the appropriate Mode and Configuration - i.e. Capable of supporting Electronic Distribution	If it is not in proper mode, the system shall be appropriately initialized.	Exact procedures are outside of scope of test, supporting personnel will be responsible for their execution.
3.	LaRC DAAC	Verify LaRC DAAC is operational in a mode capable of supporting test.	If it is not in proper mode, the system shall be appropriately initialized.	Exact procedures are outside of scope of test, supporting personnel will be responsible for their execution.
4.	SDPF and LaRC DAAC	Validate IP Address and Password information	Both systems should contain the valid information.	This step is needed to ensure flawless test execution.
5.	SDPF	Verify connection capabilities between DDF MSE and DAAC	Successful 'Ping' of other system	This is the interface for transfer of control messages
6.	LaRC DAAC	Verify connection capabilities between DAAC and DDF FSE	Successful 'Ping' of other system	This is the interface for data transfer
7.	SDPF	Verify contents of test data	The test data shall be of the appropriate Instrument, size and format as required by the test.	Generically, this step is to verify the data to be transmitted during the test execution is in fact "good".

Test Execution:

Step	Station	Action	Expected Results	Comments
1.	SDPF	Perform necessary pre-processing in order to initiate the automated transfer of the data products.	The SDPF will transmit the 'Authentication Request' to the LaRC DAAC.	SDPF Operational procedures will be followed.

2.	LaRC DAAC	Verify receipt and validation of 'Authentication Request', verify 'Authentication Response' is sent to SDPF.	LaRC DAAC shall accept and validate the 'Authentication Request' and respond with a valid 'Authentication Response'	
3.	SDPF	Verify receipt and validation of 'Authentication Response'	The Network connection between the SDPF and LARC DAAC shall be successfully opened.	
4.	SDPF	Verify that the erred DAN is transferred to the LaRC DAAC.	A message or log file should indicate transfer of the DAN.	
5.	LaRC DAAC	Verify successful receipt and validation of the DAN.	For Case-1 DANs, LaRC DAAC should respond with a short DAA reporting the error discovered in the DAN. For Case-2 DANs, LaRC DAAC should respond with a Long DAA indicating the erred file group and the error condition.	In either case, LaRC should not ingest any files from an erred DAN
6.	SDPF	Verify the successful receipt of the DAA.	Status of the DAA should be provided to the system operator in order to perform necessary manual error correction.	

Test Termination:

Step	Station	Action	Expected Results	Comments
1.	SDPF	Return the SDPF DDF system to the state, 'Operational Mode', it was in prior to the test.	.	Leave things as they were found
2.	LaRC DAAC	Return the LaRC DAAC to the state it was in prior to the test.		Leave things as they were found

### ICT6.5.3 Error Handling - FTP Get

Description:

This testcase is designed to ensure the capabilities of LaRC DAAC to handle errors encountered during the FTP of files from the SDPF DDF Files Servers. The LaRC DAAC should be able to either recover from the error condition (through the use of multiple retries) or abort the transfer attempts and inform the system operator and SDPF of the error condition. The SDPF will be informed through the use of Data Delivery Notices (DDN). A short DDN will be used to indicate system level errors (e.g. unable to logon to specific SDPF File Server) or errors common to all files in the product and Long DAAs

will be used to indicate errors at the individual file level (e.g. File Not Found). This testcase will be executed for each of the following FTP error conditions, Case 1 errors will result in Short DDNs and Case-2 errors will result in Long DDNs.

Case-1      Short DDN reports

Error-1	Network Failure
Error-2	Unable to Establish FTP Connection
Error-3	Host Denied Access
Error-4	File not found
Error-5	FTP failure - Too many errors in file transfer
Error-6	Post-transfer double-check failure
Error-7	FTP command failure

Case-2      Long DDN reports

Error-8	Network Failure
Error-9	Unable to Establish FTP Connection
Error-10	Host Denied Access
Error-11	File not found
Error-12	FTP failure - Too many errors in file transfer
Error-13	Post-transfer double-check failure
Error-14	FTP command failure

Requirements Satisfied:

TRMM1080

Test Procedures:

Test Set-up:

Step	Station	Action	Expected Results	Comments
1.	SDPF and LaRC DAAC	Determine the methods of inducing the necessary error conditions and generate any necessary data or database changes.	The necessary system/data modifications will be ready to support the error testing	This step should be executed well in advanced of anticipated text execution date.
2.	SDPF	Verify SDPF is operational with the appropriate Mode and Configuration - i.e. Capable of supporting Electronic Distribution	If it is not in proper mode, the system shall be appropriately initialized.	Exact procedures are outside of scope of test, supporting personnel will be responsible for their execution.

3.	LaRC DAAC	Verify LaRC DAAC is operational in a mode capable of supporting test.	If it is not in proper mode, the system shall be appropriately initialized.	Exact procedures are outside of scope of test, supporting personnel will be responsible for their execution.
4.	SDPF and LaRC DAAC	Validate IP Address and Password information	Both systems should contain the valid information.	This step is needed to ensure flawless test execution.
5.	SDPF	Verify connection capabilities between DDF MSE and DAAC	Successful 'Ping' of other system	This is the interface for transfer of control messages
6.	LaRC DAAC	Verify connection capabilities between DAAC and DDF FSE	Successful 'Ping' of other system	This is the interface for data transfer
7.	SDPF	Verify contents of test data	The test data shall be of the appropriate Instrument, size and format as required by the test.	Generically, this step is to verify the data to be transmitted during the test execution is in fact "good".

#### Test Execution:

Step	Station	Action	Expected Results	Comments
1.	SDPF	Perform necessary pre-processing in order to initiate the automated transfer of the TRMM Ancillary Data Product.	The SDPF will transmit the 'Authentication Request' to the LaRC DAAC.	SDPF Operational procedures will be followed and the distribution of the product to the LaRC DAAC will begin.
2.	LaRC DAAC	Verify receipt and validation of 'Authentication Request', verify 'Authentication Response' is sent to SDPF.	LaRC DAAC shall accept and validate the 'Authentication Request' and respond with a valid 'Authentication Response'	
3.	SDPF	Verify receipt and validation of 'Authentication Response'	The Network connection between the SDPF and LARC DAAC shall be successfully opened.	
4.	SDPF	Verify DAN is transferred to the LaRC DAAC.	A message or log file should indicate transfer of the DAN.	
5.	LaRC DAAC	Verify successful receipt and validation of the DAN.	A message or log file should indicate the successful receipt and validation of the DAN. The data files shall be placed in the Ingest queue and a Short DAA shall be transferred to the SDPF.	
6.	SDPF	Verify the successful receipt of the DAA.	A message or log file should indicate successful receipt of the DAA	

Only Execute the Procedures for the Specific Error Case.  
ERROR-1

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ERROR-7				
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Test Termination:

Step	Station	Action	Expected Results	Comments
1.	SDPF	Return the SDPF DDF system to the state 'Operational Mode' it was in prior to the test.	.	Leave things as they were found
2.	LaRC DAAC	Return the LaRC DAAC to the state it was in prior to the test.		Leave things as they were found

#### **ICT6.5.4 Error Handling - Data Delivery Acknowledgment**

Description:

Upon the completion of data receipt from the SDPF, the LaRC DAAC shall transfer a DDN indicating the success of the transfer. Upon receipt of the DDN, the SDPF shall want to reply with a DDA. This DDA will be altered prior to transferring it to the LaRC DAAC. The LaRC DAAC shall receive the erred DDA, and respond to it in an appropriate manner -TBD. This testcase will be executed for each of the following DDA error types:

- Disposition-1      No DDA Transmitted
- Disposition-2      Error Recovery Being Invoked

Requirements Satisfied:

TRMM1080

Test Procedures:

Test Set-up:

Step	Station	Action	Expected Results	Comments
1.	SDPF and LaRC DAAC	Determine the methods of inducing the necessary error conditions and generate any necessary data or database changes.	The necessary system/data modifications will be ready to support the error testing	This step should be executed well in advanced of anticipated text execution date.
2.	SDPF	Verify SDPF is operational with the appropriate Mode and Configuration - i.e. Capable of supporting Electronic Distribution	If it is not in proper mode, the system shall be appropriately initialized.	Exact procedures are outside of scope of test, supporting personnel will be responsible for their execution.
3.	LaRC DAAC	Verify LaRC DAAC is operational in a mode capable of supporting test.	If it is not in proper mode, the system shall be appropriately initialized.	Exact procedures are outside of scope of test, supporting personnel will be responsible for their execution.
4.	SDPF and LaRC DAAC	Validate IP Address and Password information	Both systems should contain the valid information.	This step is needed to ensure flawless test execution.
5.	SDPF	Verify connection capabilities between DDF MSE and DAAC	Successful 'Ping' of other system	This is the interface for transfer of control messages
6.	LaRC DAAC	Verify connection capabilities between DAAC and DDF FSE	Successful 'Ping' of other system	This is the interface for data transfer
7.	SDPF	Verify contents of test data	The test data shall be of the appropriate Instrument, size and format as required by the test.	Generically, this step is to verify the data to be transmitted during the test execution is in fact "good".

Test Execution:

Step	Station	Action	Expected Results	Comments
1.	SDPF	Perform necessary pre-processing in order to initiate the automated transfer of the TRMM Ancillary Data Product.	The SDPF will transmit the 'Authentication Request' to the LaRC DAAC.	SDPF Operational procedures will be followed and the distribution of the product to the LaRC DAAC will begin.
2.	LaRC DAAC	Verify receipt and validation of 'Authentication Request', verify 'Authentication Response' is sent to SDPF.	LaRC DAAC shall accept and validate the 'Authentication Request' and respond with a valid 'Authentication Response'	

3.	SDPF	Verify receipt and validation of 'Authentication Response'	The Network connection between the SDPF and LARC DAAC shall be successfully opened.	
4.	SDPF	Verify DAN is transferred to the LaRC DAAC.	A message or log file should indicate transfer of the DAN.	
5.	LaRC DAAC	Verify successful receipt and validation of the DAN.	A message or log file should indicate the successful receipt and validation of the DAN. The data files shall be placed in the Ingest queue and a Short DAA shall be transferred to the SDPF.	
6.	SDPF	Verify the successful receipt of the DAA.	A message or log file should indicate successful receipt of the DAA	
7.	LaRC DAAC	Verify that the appropriate files (as indicated in DAN) are ingested into the ECS.	Upon successful ingest, the data files shall be placed in a transferred to a permanent archive and appropriate Metadata should be produced.	When the files reach the top of the ingest queue, they shall be individually FTP'd from the DDF FSE via FTP GET command.
8.	LaRC DAAC	Verify that a DDN is sent to the SDPF indicating the successful status of the data transfer.	A message or log file should indicate transfer of the DDN.	

For Disposition-1

9.	SDPF	Verify the successful receipt of the DDN, but do not transmit a DDA to the LaRC DAAC.	A message or log file should indicate successful receipt of the DDN.	
10.	LaRC DAAC	Verify that LaRC DAAC re-transmits the DDN to the SDPF.	LaRC DAAC re-transmits the DDN to the SDPF.	There should be an operator tunable parameter indicating how long LaRC DAAC will wait for a DDA. This will be located either in a database or a flat file.
11.	Both	Repeat steps 9 - 10 until the number of retry attempts for sending DDA's is met.		There should be an operator tunable parameter indicating how long retries should be attempted for sending the DDA. This will be located either in a database or a flat file.
12.	LaRC	Upon the number of retries reaching the retry parameter, an error condition shall be set indicated the error to the LaRC system operator.		

For Disposition-2

9.	SDPF	Verify the successful receipt of the DDN and the transfer of the appropriate erred DDA to the LaRC DAAC.	A message or log file should indicate successful receipt of the DDN and transfer of the DDA	
10.	LaRC DAAC	Verify the successful receipt of the DDA.	A message or log file should indicate successful receipt of the DDA. The error condition shall be discovered and the appropriate action should be taken. System operator should be notified of the error condition.	

Test Termination:

Step	Station	Action	Expected Results	Comments
1.	SDPF	Return the SDPF DDF system to the state 'Operational Mode' it was in prior to the test.	.	Leave things as they were found
2.	LaRC DAAC	Return the LaRC DAAC to the state it was in prior to the test.		Leave things as they were found